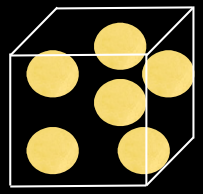
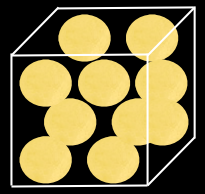
Density -

The amount of matter per amount of volume

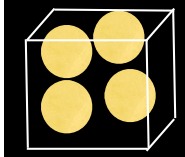


m=6 g
v=2 cm^3
d=3 g/cm^3

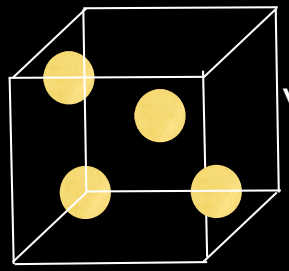


m=10 g
v=2 cm^3
d=5 g/cm^3

If each of the yellow atoms has the same mass (1 g), and the boxes are the same volume (2 cm^3), which has the greater density?



mass=4 g
volume=2 cm^3
density=2 g/cm^3



mass=4g
volume=8cm^3
density=5 x $10^{-1}g/cm^3$

Which cube has the highest density if each yellow sphere has a mass of 1 g?

Density column of liquids

Which liquid is more dense? honey

Which object has the same density as dish soap?

cherry tomato

Which liquids are less dense than water?

vegetable oil, rubbing alcohol, lamp oil

Measuring density of a geometric solid

Mass on the electronic balance

Ex: 100.26 g

Volume = L x W x H

Use rules for multiplying with sig figs!

Ex: 8.20 cm x 2.56 cm x 3.50 cm = 73.472 cm^3

Round to 3 sig figs

So, 73.472 = 73.5 cm^3

D=M/V

100.26 g/73.5 cm^3 = 1.364081632653061

3 sig figs

4 sig figs

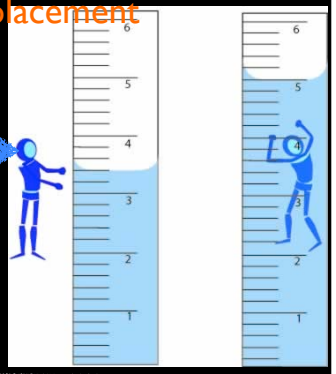
Round to 3 sig figs: 1.36 g/cm^3

Measuring density using water displacement

Mass - electronic balance

Volume - water displacement

The graduated cylinder determines the number of sig figs in the volume measurement.



Ex 1: Mass = 5.01 g

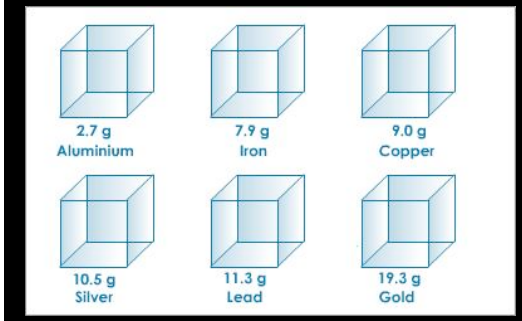
Volume in a 10 ml grad cylinder = 2.45 ml

D = M/V = 5.01/2.45 = 2.0448979 = 2.04 g/ml

Ex 2: Mass = 5.01 g

Volume in a 100 ml grad cylinder = 2.5 ml

Density = M/V = 5.01/2.5 =2.004 = 2.0 g/ml



If each cube is 1 cm^3 in volume, what is the density of each metal?

Make sure these densities are copied into your notes!!!

Accuracy:

A statement of how close a measurement or calculation is to the actual, accepted value.

We can express accuracy by calculating percent error:

$$\frac{\left| \text{Measured value} - \text{Actual value} \right|}{\text{Actual value}} \times 100$$

Precision:

A measure of how close a series of measurements are to one another.

Which set of dart throws is more precise?

Which set of data is more precise?

Warren's density measurements	Wendell's density measurements
1.001 g/ml	1.002 g/ml
1.000g/ml	1.005 g/ml
0.999 g/ml	1.000 g/ml
1.001 g/ml	0.991 g/ml
1.000 g/ml	1.010 g/ml

Is it possible to be precise without being accurate?